Structural Integrity for Mining Plants

Mining, asset integrity

Deployment:

- 3D model deployment
- Historic Data input
- Integration of available systems
- Data Contextualization
- Image Analytics
- Image Survey
- Dashboards
- Predictive maintenance

Technologies:

- Twin Navigator
- Alerts
- Image Analytics
- Dashboards
- Predictive models
- Analytics
- Planner

Challenges

Mining plants need to operate with as little downtime and risk as possible. To achieve this, actions to **ensure the integrity of the assets** involved in the operation are required.

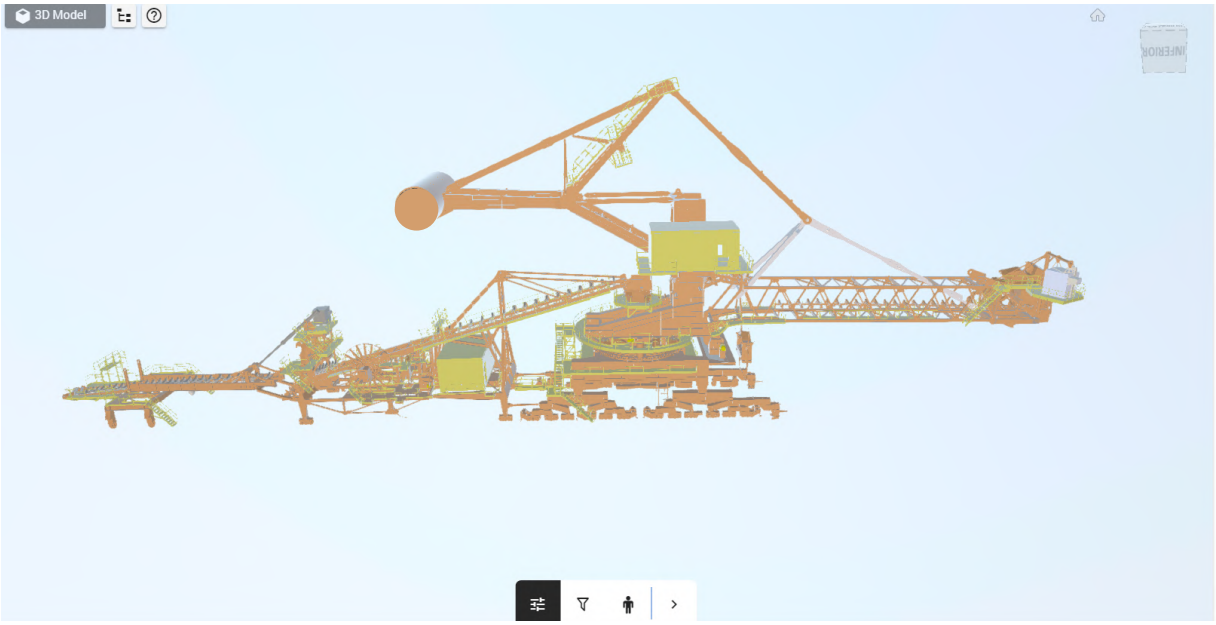
In the past, the entire asset integrity workflow was usually carried out using analog methods. However, with the popularization of digital transformation and the ongoing move towards an increasingly digital operation, the mining industry has been able to automate its core systems in search of **greater accuracy, efficiency, and safety**.

Due to the remote and difficult-to-access locations of these structures, ensuring the assets' structural integrity requires dozens of operators in the field to perform inspection and maintenance activities. Beyond being exposed to risks, **the data required and the data generated in this process are commonly diffused among different systems**. Turning out to be a time-consuming and susceptible-to-inefficiency-prone process.

Solution

The proposed solution by Vidya Technology consists of using **Digital Twin combined with 3D and AI** in the application for structural integrity management in mining sites.

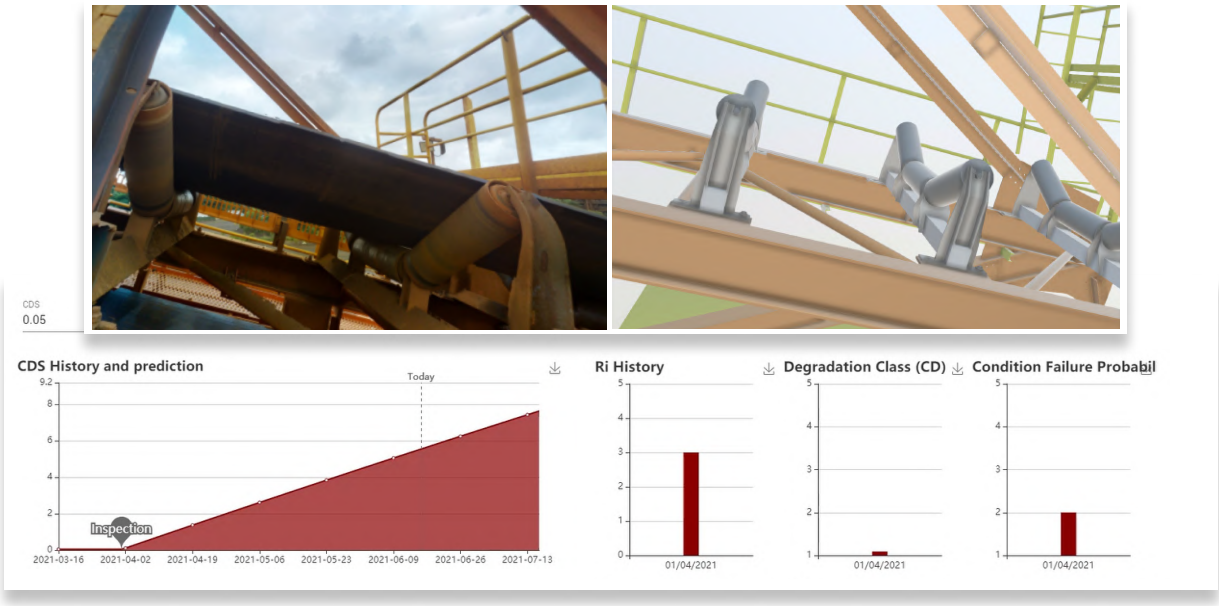
The first step of the 30 days deployment is the setup of a 3D model, where diffused and untrusted data are **contextualized** into the platform. Each piece of information is linked directly to its respective asset in the 3D model.



From this point on, all data is organized, qualified, and contextualized according to the project's purposes and the client's business rules. In the application, even condition failure probability, structural priority and risk matrix data was included. The system works as a bridge between data sources, integrating them all.

Once the platform is deployed, field images are captured with the support of drone images and 360 cameras. The images are then processed by IA Image analytics, an algorithm developed and previously trained by Vidya, able **to automatically detect areas affected by corrosion and areas impaired with dirt**.

Succeeding, the qualified inspector proceeds to the structural integrity virtual assessment. It is performed **100% remotely** by navigating the digital twin, analyzing field photos processed by AI, and filling out inspection checklists. **Those checklists include corrosion classification according to the client's standards and identification of anomalies such as cracks, fractures, or fissures**. The other differentiator is the assertive corrosion mapping of the component, in which it is marked, directly in the 3D model, areas affected by corrosion, and areas that need to be coated.



Finally, structural integrity plans are automatically generated by the platform, and all the data can be viewed and analyzed on dashboards, **enabling quick decision-making**. Another significant output is that since Vidya proposes an **end-to-end tool**, those maintenance plans or maintenance notes can be directly integrated and exported to ERPs.

This way the percentage of **people on the field is reduced**, safety is improved and the management of inspection and maintenance routines are strongly enhanced.